

Amendment and Response

Applicant: Wolfgang Hetzel et al.

Serial No.: 10/577,173

Filed: October 27, 2009

Docket No.: I441.141.101/QIM4346

Title: SEMICONDUCTOR DEVICE WITH PLASTIC PACKAGE MOLDING COMPOUND, SEMICONDUCTOR CHIP AND LEADFRAME AND METHOD FOR PRODUCING SAME

REMARKS

The following remarks are made in response to the Non-Final Office Action mailed September 3, 2010. Claims 1-15 have been previously cancelled. Claims 16-30 and 32-35 were rejected. Claims 31 and 34 have been objected to. With this Response, claims 16, 19, 22-25, 27, 30 and 31 have been amended. Claims 16, 19, 22-25, 27, 30-33, 36-40 remain pending in the application and are presented for reconsideration and allowance.

Claim Objections

Claim 34 was objected to due to informalities. Claim 34 has been canceled, overcoming the objection.

Claim Rejections under 35 U.S.C. § 112

Claim 34 was rejected under 35 U.S.C. 112, second paragraph. Claim 34 has been canceled, thus overcoming the rejection.

Claim Rejections under 35 U.S.C. § 102

Claims 16-23, 26-30, 32 and 35 were rejected under 35 U.S.C. 102(b) as allegedly being anticipated by Moden (US 6,310,390; “Moden”). Claims 17, 18, 20, 21, 26, 28, 29, 34 and 35 have been canceled, rendering their rejections moot. Applicants respectfully traverse the remaining rejections.

It is well accepted that, to anticipate a claim, the cited reference must disclose each claim element. MPEP 2131. Applicants respectfully submit that Moden fails to disclose each element of the pending claims. As such, Moden cannot anticipate these claims.

As amended, claims 16 and 27 include a metal layer and claim 19 includes a stack of elastic metal layers. The metal layer or the stack of elastic metal layers completely covers the leadframe in the peripheral regions of the semiconductor device, with the peripheral regions being free of the elastic adhesive layer and mechanically decoupling the plastic package molding compound from the leadframe. Claim 30 includes the limitation that a pattern of a metal layer is

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applied to the leadframe before the application of the adhesive layer, the pattern of the metal layer covering more than the width of sawing tracks so that the adhesive layer is not exposed to the sawing process.

The above-mentioned features are not disclosed by Moden. Moden discloses a BGA package 10 and a method for fabricating it. As shown in figure 1C, the BGA package 10 includes a plastic package molding compound 18 (“encapsulating resin”), a semiconductor chip 12 and a leadframe 14. The semiconductor chip 12 is embedded in the plastic package molding compound 18. The semiconductor chip 12 and the plastic package molding compound 18 are arranged on the leadframe 14. The BGA package 10 further includes an adhesive layer 36 (“polymer tape” see column 5, lines 14 to 17) arranged between the semiconductor chip 12 and the leadframe 14, and between a portion of the plastic package molding compound 18 and the leadframe 14. Peripheral regions of the BGA package 10 are free of the adhesive layer 36. In these regions, a portion of the plastic package molding compound 18 is directly arranged on the leadframe 14 and on bond pads 26 arranged on the leadframe 14. The bond pads 26 are electrically connected to bond pads 20 of the semiconductor chip 12 by means of bond wires 30. The bond wires 30 are equated with the elastic metal layers of the current claims 18, 21, 29 (see Office Action at page 3).

Neither the bond wires 30 nor the bond pads 26 completely cover the leadframe 14 in the peripheral regions of the BGA package 10 of figure 1C. Furthermore, because a portion of the plastic package molding compound 18 is directly arranged or anchored on the leadframe 14 in the peripheral regions, the plastic package molding compound 18 is not mechanically decoupled from the leadframe 14 in these regions. Consequently, the provision of a metal layer or a stack of metal layers completely covering the leadframe in the peripheral regions and mechanically decoupling the plastic package molding compound from the leadframe as recited in the claims is not disclosed by Moden.

A production of the BGA package 10 of Moden is shown in figures 2A to 2G. A panel is produced, and a sawing process for singulating individual BGA packages 10 is conducted as shown in figures 2F and 2G. Neither shown nor described is the usage of a pattern of a metal

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layer covering more than the width of sawing tracks such that the adhesive layer is not exposed to the sawing process. As can be seen from the figures, both the adhesive layer 36 and the bond pads 26 and bond wires 30 are located in a distance from the sawing tracks.

Accordingly, Applicants believe claims 16, 19, 22, 23, 27, 30 and 32 are in condition for allowance.

Claim Rejections under 35 U.S.C. § 103

Claims 24, 25 and 35 were rejected under 35 U.S.C. 103(a) as being unpatentable over Moden alone or in combination with additional references. Claim 35 has been canceled. Claims 24 and 25 depend on claim 19 and are therefore allowable for at least the same reasons.

Allowable Subject Matter

The Examiner objected to claim 31 for being dependent upon a rejected base claim. The Examiner's acknowledgment of the allowable subject matter is appreciated. However, as noted above, claim 30 is believed to be allowable. Claim 31, dependent on claim 30, is therefore also allowable.

New Claims

Claims 36-40 have been added herein. These claims ultimately depend on claim 16, 27 or 30 and are therefore allowable for at least the same reasons.

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CONCLUSION

In view of the above, Applicant respectfully submits that all of the pending claims are in form for allowance. Therefore, reconsideration and withdrawal of the rejections and allowance of the claims are respectfully requested.

No fees are required under 37 C.F.R. 1.16(h)(i). However, if such fees are required, the Patent Office is hereby authorized to charge Deposit Account No. 50-0471.

Please consider this a Petition for Extension of Time for a sufficient number of months to enter these papers, if appropriate. At any time during the pendency of this application, please charge any additional fees or credit overpayment to Deposit Account No. 500471.

The Examiner is invited to contact the Applicant's representative at the below-listed telephone numbers to facilitate prosecution of this application.

Any inquiry regarding this Amendment and Response should be directed to Mark L. Gleason at Telephone No. (612) 767-2503, Facsimile No. (612) 573-2005. In addition, all correspondence should continue to be directed to the following address:

Dicke, Billig & Czaja
Fifth Street Towers, Suite 2250
100 South Fifth Street
Minneapolis, MN 55402

Respectfully submitted,

Wolfgang Hetzel et al.,

By their attorneys,

DICKE, BILLIG & CZAJA, PLLC
Fifth Street Towers, Suite 2250
100 South Fifth Street
Minneapolis, MN 55402
Telephone: (612) 573-2000
Facsimile: (612) 573-2005

Date: 11/24/2010
MLG:cms

/Mark L. Gleason/
Mark L. Gleason
Reg. No. 39,998